

OPEN+ Methane Cohort

PROJECT DESCRIPTIONS

Rice University – Houston, TX

Converting Hydrocarbons to Recyclable Materials for Metal Replacement with Positive Hydrogen Output – \$3,300,000

Rice University will develop recyclable, lightweight materials that could be used to replace metals in automotive applications. The team will convert natural gas into carbon nanotubes with concurrent production of hydrogen, spin them into fibers, and evaluate the fiber performance and properties with the target of displacing metals. The proposed technology could significantly reduce energy consumption and carbon dioxide (CO₂) emissions associated with metal production, while producing hydrogen. Such recyclable, lightweight, and low-cost materials could provide an alternative to metals in automotive applications, reducing vehicle weight, reducing fuel and energy consumption, and reducing CO₂ emissions.

Nanocomp Technologies, Inc. – Merrimack, NH

High Value, Energy Saving Carbon Products and Clean Hydrogen Gas from Methane – \$3,479,624

Nanocomp Technologies will develop an industrially scalable method to convert natural gas to a high-value carbon material, Miralon®, while also producing hydrogen. Converting methane to solids serves effectively as pre-combustion carbon capture. This project aims to build a flexible, transportable network of production systems that can be installed at methane generation or consumption sites and redeployed to new locations. The application of the technology could result in U.S. energy savings and CO₂ emission reductions.

ETCH, Inc. – Chevy Chase, MD

Carbon Dioxide-Free Hydrogen and Solid Carbon from Natural Gas via Metal Salt Intermediates – \$3,690,304

ETCH will scale-up a novel process to convert natural gas into hydrogen and solid carbon with no water input and reduced carbon dioxide (CO₂) emissions. Leveraging industrial partners, Southern Company and Cabot Corporation, the team will scale-up the ETCH cyclic process based on early laboratory demonstrations. The process is expected to produce hydrogen fuel from natural gas at costs comparable to the state-of-the-art commercial technologies, while lowering energy input, reducing CO₂ emissions, and producing high-value pure carbon materials.

Palo Alto Research Center, Inc. – Palo Alto, California

High-Throughput Methane Pyrolysis for Low-Cost Hydrogen – \$3,946,542

Palo Alto Research Center (PARC) and its partners will develop a new, high-throughput reactor technology for hydrogen (H₂) production. The team will demonstrate the use of a molten-metal mist reactor to convert natural gas into hydrogen and solid carbon at a low cost without carbon dioxide emissions. The technology could replace current H₂ production methods, while simultaneously sequestering carbon in high value materials and placing the United States at the forefront of the H₂ production industry.